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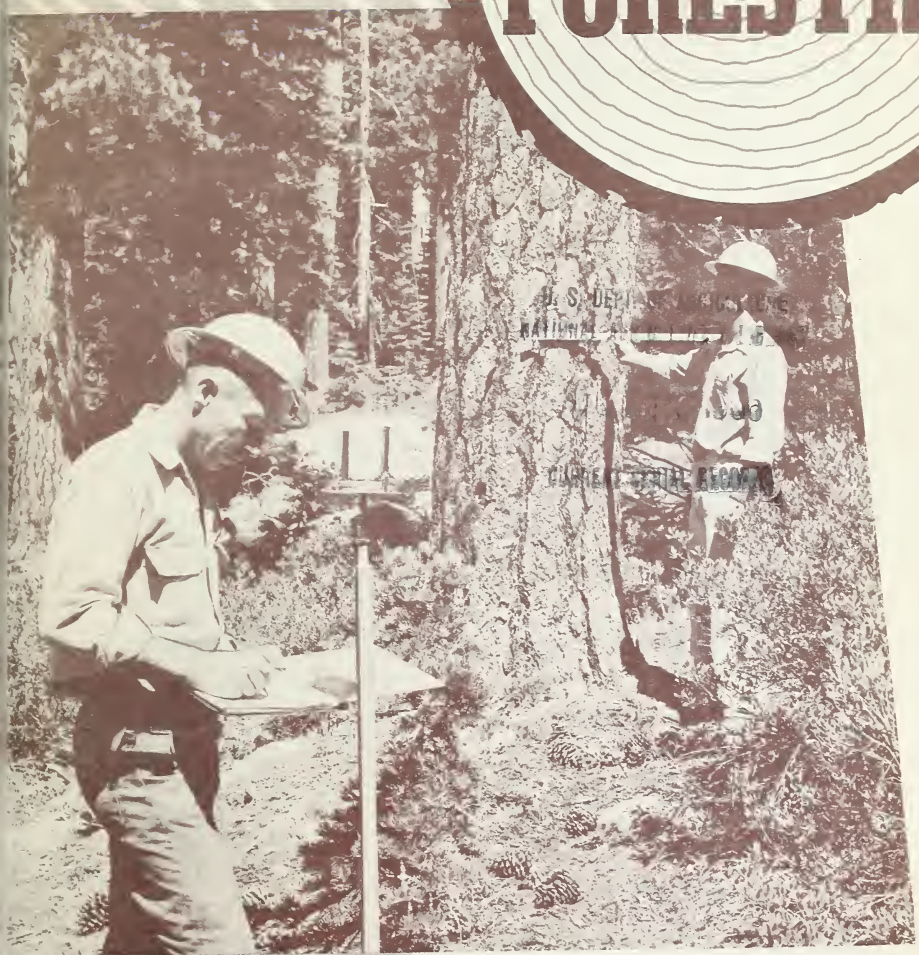
Careers in FORESTRY



Forest Service
Miscellaneous Publication No. 249
UNITED STATES DEPARTMENT OF AGRICULTURE

This publication deals primarily with careers in technical forestry, the practice of which calls for professional training. Many nonprofessional workers, such as skilled and unskilled laborers, mechanics, lookout men and fire-control aids, accountants, clerks, and stenographers, are employed by public forestry agencies and private forest industries. Although these employees play an important part in forest work, their jobs ordinarily do not call for fundamental training in the science of forestry. Information on employment possibilities for nonprofessionals can be obtained from the employing agencies.

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Careers in Forestry

Prepared by the Forest Service

FORESTRY AS A PROFESSION

THE MAN WHO CHOOSES A CAREER IN FORESTRY has the opportunity to serve his fellowmen in a vitally important field. Forestry deals with the development of forests in such a way as to perpetuate their many services and benefits to mankind. The forests provide wood and other products for man's use; they prevent erosion of the soil and regulate streamflow and water supply for irrigation, for hydroelectric power, and for domestic use; they harbor wildlife, and give abundant opportunity for outdoor recreation.

When forestry is practiced, timber becomes a crop produced under scientific methods. American forestry has developed various techniques, applicable to different forest types and regions, in timber growing and harvesting; protection from fire, disease, and insects; watershed protection; and wildlife and recreation management. Range management is also in the field of forestry, because in the Western United States large areas of rangeland are intermingled with forest and must be handled coordinately.

Foresters are today charged with the solution of one of our Nation's major economic problems, that of putting to the best use for human welfare the 664 million acres of land most suitable for forest purposes. Complete and thorough training is fundamental to a career in the profession.

When the need for the practice of forestry was first recognized in this country in the 1870's, there were no schools of forestry on this side of the Atlantic. This situation prevailed until 1897 when Dr. C. A. Schenck, a German forester, started giving private instruction in connection with his work on the Vanderbilt estate at Biltmore, N. C. The following year Cornell University established a professional school of forestry. Then in 1900 the Yale Forest School was started, and, in the years that followed, other universities and colleges added forestry to their curriculums.

It is estimated that by 1912 there were approximately 500 men in the United States with some technical training in forestry. These were in addition to early-day forest rangers who began without a technical background, but through their own experience in Federal and State work had acquired considerable practical knowledge of certain phases of the subject. The pioneer foresters were zealous crusaders in the cause of conservation. Although the *idea* of conservation is more widely accepted today, the *practice* of conservation is still far from being generally applied. A crusading spirit in the public interest still is strong in the forestry profession; it must continue so.

Need for Technical Training

The importance of proper training now and in the future for a career in forestry cannot be overestimated. As the number of foresters steadily increases and competition becomes keener, thorough education will become more and more necessary. The technical forester should have an education comparable to that of the lawyer, civil engineer, or other well-trained pro-

fessional man. Such an education usually requires a minimum of 4 years of college work. A course of 5 or 6 years—1 or 2 of which are spent in post-graduate work—is desirable for those interested in forest research. The large number of men who look for employment in the lumber business or other forest-using industries will find college training in the principles of forestry as valuable to their success as it is to that of the men who plan to specialize in more scientific and technical forestry work.

College training is but a part of the preparation needed. It must be supplemented by first-hand experience in forest or conservation work. Many young men obtain part of this experience through summer-school camps and some get it through fieldwork during summer vacation periods in a Federal or State forest, a conservation organization, or in the employ of a lumber company. Men who plan to specialize in lumbering find several years of work in logging camps and mills valuable in learning the practical details of the business.

Courses leading to degrees in forestry are offered in about 40 institutions. Many other colleges also include forestry in their curriculums, the instruction being given on a nonprofessional basis as supplementary training in other degree courses. Enrollment of undergraduates in the forestry schools in the United States prior to World War II totaled more than 6,000. Figures from the forestry schools indicated that about 500 degrees were being granted annually. About 1,900 bachelor's degrees in forestry were granted in the academic year 1962–63.

A list of the schools rated as accredited forestry schools by the Council of the Society of American Foresters can be obtained from the Forest Service, U. S. Department of Agriculture, Washington 25, D. C. In most cases, a 4-year course is offered, leading to a degree of Bachelor of Science in Forestry. Several universities provide graduate instruction leading to Master of Forestry and doctorate degrees. As a Government agency, the Forest Service is not in a position to express an opinion as to the relative merits of the schools or their courses. Information concerning entrance requirements, tuition, etc., can be obtained by applying directly to the institution.

Women in Forestry

Forestry has generally been considered man's rather than woman's work. It will probably continue to be primarily, although not exclusively so. A few women have acquired technical training in forestry and have found employment in this field—for the most part in research or educational work. There have been instances of women successfully managing logging and other industrial forest enterprises, having in most cases "grown up in the business."

The opportunities for women in technical forestry work, however, are limited. Many outdoor positions are necessarily restricted to men; physical difficulties and other conditions in the field make the employment of women impracticable from the standpoint both of the employee and the employing agency. And since experience in such fieldwork is generally a requisite for promotion to higher administrative or technical positions, women are unfortunately at a disadvantage.

In the nontechnical field, many women are employed in forestry agencies as clerks, stenographers, secretaries, draftsmen, etc.; and as a result of experience and special aptitudes, some have risen to important positions.

The woman who trains as a professional forester, however, is not apt to find a ready-made job waiting for her. She will have to compete with men trained for the same work and demonstrate her special fitness in what has been largely a man's field.

CHARACTER OF FORESTRY WORK

Many persons still have only a vague idea of the kind of life the forester really leads. Young men are often attracted to the profession because of the prospect of outdoor work. They are fond of camping in the open and of hunting and fishing.

One who is considering such a career should remember that the forester in his fieldwork sometimes must endure hardships that sportsmen do not encounter. Spending considerable time in the woods as part of one's regular business is quite different from camping out for a few weeks on a vacation.

A variety of tasks usually greets the forester on his first job. He may be involved in such work as cruising or marking timber, making range surveys, reforestation of cutover or abandoned farmlands, and possibly in planting or conservation work in soil-erosion or flood-control areas. During his apprenticeship he is certain to be used on a number of different tasks in which his technical skill and ingenuity are put to test. If he shows outstanding ability, the young forester may find the apprenticeship period a

F–501008

A Forest Service staffman acting as fire boss gives instructions on control of a distant flareup by radio. With him is an Apache fire crew chief flown from New Mexico to help fight the large fire in Idaho.

short one, although as the number of foresters increases and competition becomes more intense, the training period may be expected to lengthen.

The young forester is apt to have his headquarters shifted frequently, somewhat like the civil engineer. The places to which he is assigned may not always be the most desirable from the standpoint of personal comfort or convenience, especially for family life. Because of this shifting about, he may be unable for some time to establish a home. On the other hand, if he is an able man, he may ultimately advance to a position that will give him more permanent headquarters and greater opportunity for home life. He must not count himself secure, however, against a change of working field which will necessitate removal to a new place. Ordinarily, his home will be in a small town or its vicinity.

Even in the higher positions, whether in Government or private work, the forester may have to spend a great deal of time supervising or inspecting actual field operations. Trips away from his headquarters may be for only a day or so, or they may be for several weeks. In some positions such travel often includes long, hard journeys by horse and pack train. Frequently it means rough walking, and sometimes days of slow and laborious progress by snowshoe or canoe. Even with the greatest possible extension of good roads, much of the forester's travel for many years to come will necessarily be arduous.

Variety of Tasks

The character of the work which foresters are called upon to do varies greatly. It may depend upon the aptitudes of the individual, his previous experience, and the degree and kind of his specialized training.

For many the work is largely administrative. They conduct timber sales, supervise range use, organize and maintain a fire-control organization, and handle various other operational jobs involved in the management of a forest area. Others spend the greater part of their time in such work as determining the amount and rate of timber growth on given tracts, or working out the best methods of cutting to obtain a second crop without recourse to planting. And still others work on all kinds of problems associated with the life history and productive capacity of the forest. Some foresters must concencrate on problems relating to the determination of grazing capacities and systems of range management that will improve and perpetuate this resource. Others must deal with wildlife and its management.

Groups of foresters are also engaged in devising methods of protecting the forest from fire, disease, and insects; in operating efficient systems of administration; and in dealing with the problems of utilization of the forest and its products. Special aptitudes or interests may lead some men permanently into flood-control or soil conservation work. Others may find employment in connection with various forest, watershed, and land surveys, or recreation work.

The majority of foresters have to deal with both the scientific and business aspects of the profession. In brief, they must be good businessmen with thorough technical education. They must be able to manage and develop the property under their care in such a way as to make it yield high returns at low cost. Their scientific equipment is a matter of thorough schooling; the business equipment must be gained through experience. Both are essential.

REQUISITES FOR SUCCESS

Intelligence, industry, honesty, and soundness of character are important personal requisites of the successful forester. He must like the sort of life he will be called upon to lead; if he does not, he may find the work monotonous and even positively disagreeable. Although the profession is not purely a muscular one, good health and a constitution that can stand it are requisites.

F–379063

One of the more arduous but interesting tasks of a forest officer—making a winter survey of elk in a National Forest.

Administrative and executive ability are necessary for many positions. The forester's work in such positions is concerned either directly or indirectly with the practical business administration of forest property. When he has advanced beyond an assistantship, he has charge of men and consequently must possess the ability to lead and direct. However, his advancement beyond an assistantship will depend, as in other professions, on whether he is capable of more than just carrying out plans others have made.

In the strictly research field the forester may not have large administrative responsibilities, but the results of his research are essential to proper handling of the forests. He must not only show a thoroughness in details but have, to a high degree, the qualities of foresight and breadth of vision. Modern conveniences and techniques owe their genesis in many instances to the painstaking search of scientists who labored to obtain the basic truths for which others found a practical application.

Many foresters must also have the qualities needed by a successful teacher. In their efforts to develop better public understanding of forest conservation problems, they perform the functions of educators. Such work

is part of the forester's regular duties in many positions. Nearly every forester, whether consciously or not, is helping to mold public sentiment. Hence his job requires ability to meet people and gain the confidence of the public.

In public forestry the spirit of service is a most important requisite for success. It is the spirit that causes men to place the interests of society and of the group at large above the interests of one's self or of the few. It is exemplified in the policy that governs the administration of our National Forests—of so managing the Forests as to promote the greatest good for the greatest number of our people in the long run.

Conservation of our natural resources is today one of the greatest internal problems of the Nation, and conservation with use is the essence of forestry. The forest is a resource that must be conserved; it is also an agency for the conservation of other natural resources such as soil, water, wildlife, and forage. The work done in forest conservation in this country has been accomplished by men imbued with the spirit of service and believing wholeheartedly in what they are doing. The task of carrying this work forward demands men capable of overcoming great obstacles.

THE FIELD OF WORK

Foresters are now employed by the Federal Government; the States, most of which have forestry departments; municipalities; lumber companies and private owners of timberland; wood-using industries; educational institutions; and organizations conducting research or promotional work in forestry.

Up to the close of the first decade of this century, the United States Government was the principal employer of American foresters. In 1912 it was officially estimated that 60 percent of the foresters in this country were in Federal Government work and that fully 95 percent had been so engaged at one time or another. Since then the States, municipalities, educational institutions, and private corporations have absorbed large numbers of graduating foresters. However, with the expansion of the Federal Government's forestry activities in recent years, it still remains the largest employer of trained foresters.

Although the majority of professional foresters now in Federal Government employ are in the United States Forest Service, a number of foresters are employed in the management of forest lands on Indian reservations under the Bureau of Indian Affairs of the Department of the Interior. Foresters are also employed in the National Park Service, the Bureau of Land Management, and Fish and Wildlife Service of the same Department; in the Income Tax Unit of the Treasury; in the Tennessee Valley Authority; in the Department of Commerce; and in the Soil Conservation Service of the Department of Agriculture.

Careers in the Forest Service

The Forest Service is proud of its spirit of public service. In employing new personnel it seeks to obtain men and women who are not only properly trained for the work but have high ideals and a strong desire to serve the public.

F-487691

A District Ranger and his assistant on a range inspection trip stop to talk with a cattle grazing permittee and his helper. Forest officers have many personal contacts with forest users; friendly relations with them aid mutual understanding and efficient land management.

All permanent Forest Service professional and scientific positions are in the classified civil service. These jobs require academic training at least equivalent to graduation from a recognized college or university offering a course of study in the professional or scientific field involved. The U. S. Civil Service Commission gives several entrance examinations through which the Forest Service recruits its professional and scientific force.

Lines of Advancement

Men who pass the junior professional examinations and receive appointments are first assigned to positions as assistant to district rangers on the National Forests or to subordinate lines of technical work in research or in State and private forest cooperative work. They may be assigned as technical assistants on the staff of the forest supervisor. The beginner in the Service may thus supplement his academic training by experience that should qualify him for advancement to the position of district ranger, or to comparable positions in research or cooperative work.

In the early days of the Forest Service the forest ranger did not always have a background of technical training, nor did he carry the responsibilities that a district ranger now does. Such positions were often filled by men who passed examinations based mainly on practical experience in woodsmanship. The situation has changed with the times.

The district forest ranger is today an administrator of a large area and a supervisor of all the activities within his district. The business he conducts is often the largest of any in the community. Both technical training and practical experience are required. Ranger jobs are now filled through

promotions, as are other key positions in the Service. The length of time a technically trained man may spend in subordinate positions before he becomes a district ranger will vary both with individual qualifications and with the opportunities offered.

After appointment in the Forest Service, a forestry graduate should expect to spend from 1 to 2 years as a junior forester. The first year of service is the probationary period, an extension of the examining process. Those who are not adapted to practical forestry work are separated from the Service during this period. Those who are retained beyond the 1-year period are ordinarily promoted to more responsible positions such as assistant district ranger, where training continues. From 3 to 10 years may elapse before the appointee is promoted to a district ranger position.

One line of advancement may lead the young forester from an assistant ranger position to district ranger, then assistant forest supervisor, from which he may advance to a supervisor's position. Additional promotions may eventually take him to the regional forester's office or even higher.

Another line of progress may be from technical assistant on a forest ranger district to technician on the supervisor's staff, followed by assignment as technician for an entire region. Other lines of promotion may be taken in the research field—starting, for example, as a technical assistant and advancing to project leader or specialist on some phase of the experimental work, or to a staff position at a forest and range experiment station. In State and private cooperation, a young forester is usually assigned to farm forestry or similar cooperative work only after some preliminary experience. He may advance to regional or headquarters staff positions in this field. Varying combinations of these lines of promotion may be applied in individual cases. To broaden his knowledge and experience, a man may be assigned at different times to National Forest administration and to research or cooperative work. Thorough technical training and wide experience are now considered prerequisite to success in the higher positions.

The career idea is thus carried out by advancement within the Service as men become more proficient in their work. Forest supervisors, assistant supervisors, and regional and national officers are men who have come up through the ranks.

Special Assignments and Positions

Technical assistants to the ranger may be assigned to fire control, road and trail construction, timber culture, or other special jobs. Similarly, staff technicians directly under the forest supervisor may also be assigned to any one of these functions on the entire forest: Fire control, watershed protection, timber plans and sales, wildlife, range management, improvements of various kinds, timber culture, recreation, flood and erosion control, or general technical work.

Experts for technical positions in a number of other lines of work in the Forest Service are recruited by special civil-service examinations. There are many of these jobs, such as: Forest ecologists, entomologists, pathologists, soil scientists, engineers in timber tests, chemical engineers, and wood technologists. Clerks, stenographers, accountants, and similar office workers are likewise appointed from civil-service registers established through the regular examinations for such positions.

Forest Service Salaries

Professional positions on the National Forests comprise several grades. The approximate annual gross salary ranges (entrance rate and maximum salaries) are as follows: Forester (starting grades), $5,000 to $7,850; ranger staff assistant, $6,050 to $9,425; district ranger, $7,220 to $13,445; forest supervisor staffman, $7,220 to $13,445; forest supervisor, $12,075 to $18,580. Similarly, the salaries in higher administrative positions are in keeping with responsibilities. When Government living quarters are provided there is a deduction from salary, the amount varying with the value and kind of accommodations.

Public Works Programs

The work of the Forest Service was considerably expanded from 1933 to 1942 by the emergency relief and recovery activities. Forest work for unemployed youth brought into the forests many thousands of men in Civilian Conservation Corps camps. With these activities came a demand for foresters and men otherwise qualified for field supervisory positions. Hundreds of young men recently graduated from professional schools found opportunities which offered an immediate chance to gain both a living and valuable forestry experience. The social and economic value of forest work is large, and as an outlet for unemployed labor forestry is now well recognized. Public works programs in forest conservation, or greater recognition of the need to have this work done as a regular continuing public activity, may broaden the field for the employment of foresters as directing and technical personnel.

Forest Service Organization

Organization of the Federal Forest Service now includes 26 divisions. These are correlated into 6 groups. Some are fiscal and facilitating divisions in which the nature of the work calls for training entirely different from forestry, although forestry-school graduates with special aptitudes or experience often find opportunities in these divisions. Men with professional forestry training are employed, in the main, in work that may be grouped under the administration of National Forests, forest research, or State and private forest cooperation. Certain other phases of Federal forestry work, such as the guayule rubber and other emergency projects undertaken during the war, and various phases of extension, information, and education work, allied to, or closely coordinated with the activities of one or more of the divisions, have also provided employment for many professional foresters.

The Forest Service employs a permanent force of approximately 18,000. About 5,000 are professional foresters, 2,500 in other professions, and the remainder administrative, custodial, and protection and construction forces. About two-thirds are employed on the National Forests as supervisors, assistant supervisors, rangers, etc., and the remainder are engaged in administrative, scientific, and clerical work at the Washington and regional headquarters, the Forest Products Laboratory, and the forest and range experiment stations, or in State and private cooperation work in various parts

of the country. In addition, about 10,000 lookouts, patrolmen, fire fighters, and other nonprofessional workers are temporarily employed each year on the National Forests during the fire season.

Administration of the National Forests

The National Forests cover a total net area of approximately 180 million acres. Of this area more than 138 million acres are in the States west of the Mississippi River, chiefly in the mountains of the far West. About 21 million acres are in Alaska, and approximately 21 million acres in the eastern States and Puerto Rico.

The protection, administration, and development of this vast area constitute one of the principal tasks of the Forest Service and occupy the time and energies of a large number of its men. The management of these forest properties distinguishes the work of the Forest Service from that of most Government bureaus. Its practical requirements have been met by a highly decentralized form of administration whereby the responsibility for handling local problems has been placed in the forest officers on the ground.

Administration of the National Forests necessarily centers in the Washington office, to which are attached certain higher officers engaged in general direction and inspection; but for promptness and convenience of field administration 10 National-Forest regions have been established—9 in the States and 1 in Alaska. Each region is under the direct charge of a regional forester; associated with him are such technical assistants as may be necessary for the conduct of the work.

There are now about 155 National Forests, averaging more than a million acres each. A supervisor is in charge of each Forest, and his staff may include an assistant supervisor and a number of technicians. The Forests are also divided into districts, each in charge of a district ranger, who is responsible for the protection of this area and for the conduct of its business. During the field season, fire-control assistants and other aides are employed to supplement the regular force.

The protection of the National Forests from fire is of fundamental importance. Without adequate protection, all other efforts directed toward increasing the productivity of the Forests might be entirely nullified. Continuous effort has therefore been directed toward this objective.

The use of the Forests by the public is continually increasing and this has necessarily intensified the fire problem. In addition, it has necessitated the handling of an immense amount of current business. The large volume of business involved in the management of forest and forage and in the multiple use of land calls for constant and painstaking supervision.

All the different lines of work on a National Forest are handled by the regular administrative force under the immediate direction of the supervisor. Since the very beginning, an effort has been made to apply the best forestry practice practicable under existing conditions and the more technical phases of the work have accordingly been handled as far as possible by the men with technical education—men who have entered the Forest Service as junior foresters and range conservationists. These men have had to perform such duties as mapping and estimating the timber on the Forest, marking the trees to be removed in timber sales, raising stock at nurseries for field planting, reforesting treeless areas by planting, and looking

after the varied phases of flood control and range management. The rangers also are called upon to do work of this character in addition to their regular protection and administrative duties.

The second step in the development of the Forests has been the preparation of detailed plans for the administration and use of the resources of each Forest. Such plans require sound technical training for their preparation and execution. Their perfection will be achieved only through the painstaking work of years, but already the results of better management clearly justify their application.

F-505306

Forest officers installing a study transect to determine whether range vegetation is improving or deteriorating under grazing use. Data are taken at about 5-year intervals. John Muir Wilderness Area in California.

Forest Research

Forest research offers an opportunity within the Forest Service for constructive work having a high public-service value. No other phase of forestry offers a more attractive career for men having the creative impulse.

Research conducted by the Forest Service includes four main fields of work: Forest and range management, forest products, forest resources, and forest protection. Primary objectives of these research activities are to lay the scientific foundation for such management of forest and rangelands as well help to insure (1) supplies of timber and forage suitable in quality and ample in quantity for national needs; (2) effective utilization of wood and other forest products and reduction of waste; (3) regulation of streamflow; prevention of erosion; furtherance of public health and outdoor recreation; maintenance of fish, game, and other wildlife, scenic benefits, etc.; and (4) protection of timber crops from fire, insects, and disease.

Research is carried on at 10 regional forest and range experiment stations, the Forest Products Laboratory at Madison, Wis., the Institute of Tropical

Forestry in Puerto Rico, and about 80 research project locations. More than 1,000 technical men are engaged in this work, and additional temporary assistants are employed in some phases of it when needed. The majority of the technical men and women are forestry school graduates, but geologists, entomologists, pathologists, botanists, chemists, engineers, economists, statisticians, and others are also engaged.

Most of the technicians employed in research have had advanced training; many have doctors' degrees or their equivalent. The various phases of forest research require as a foundation broad training in natural science with emphasis on forestry, regardless of whether the technician is to deal with forest management and protection, watershed management, range management, forest products, or forest economics. Advanced work—beyond this foundation training in forestry—may be in any one or more of a large group of biological or other sciences, such as plant physiology, pathology, entomology, ecology, soils, genetics, taxonomy, mathematics, and organic chemistry.

F-493525

A technician at work in crossbreeding of pines. The canvas bags will protect the artificially pollinated cones from seed-eating squirrels.

State and Private Forest Cooperation

About 386 million acres, or nearly four-fifths of our total commercial timber-growing area, are now in State or private ownership. Of this, 359 million acres are privately owned and include 165 million acres in farm woodlands. The area under State or county ownership is continuously increasing through public acquisition for State forest purposes and through tax delinquency.

The future of forestry in the United States depends in no small degree upon acceptance and operation of better forestry practices on private lands.

F–505659

A research forester at work in the laboratory. The microtome cuts extremely thin slices for microscopic study of cell structure.

The problem of bringing about this improvement constitutes a challenge to the profession. Advancement in these phases of forestry has been the objective of several acts of Congress.

The Federal Government is cooperating in the protection of State and private lands from fire through financial aid to the States under provisions of the Clarke-McNary law of 1924. Forty-nine States cooperate in fire protection, and the total area of forest lands covered in 1960 was approximately 402 million acres. This was more than 92 percent of the area in need of protection. The fire-protection projects are administered by or under direction of the State forestry departments, the Forest Service cooperating in development of plans, establishment of standards of procedure, and inspection of the work. Under the terms of the law, the Federal Government limits its expenditures in a given fiscal year to a sum not greater in each State than the funds expended jointly by the State and qualifying private owners.

The Forest Service is also cooperating under the Clarke-McNary law with 48 States, in addition to Puerto Rico, in the production and distribution of young trees for planting windbreaks, shelterbelts, and forests. Under this program about 845 million trees were distributed to woodland owners in 1960.

Additional assistance is offered by the Government under the Clarke-McNary law in the form of information for farm woodland owners on the

management and care of their timber. In this project the Department of Agriculture cooperates with the States in the maintenance of extension foresters to provide demonstrations and advice on the more efficient management of farm woodlands, the reforestation of those farmlands not now suitable for agricultural crops, and the marketing and utilization of farm timber.

Under the Cooperative Forest Management Act of 1950, the Forest Service cooperates with the States in providing on-the-ground technical advice to owners of private forest lands and to processors of primary forest products. In 1962 a total of 540 projects in 48 States were carried on in cooperation with State foresters.

Forestry in the States

Forestry work in the States has made notable progress in recent years, and most States now employ foresters in various capacities. The State forester usually carries heavy responsibilities as directing head of a large organization and has under his control the annual disbursement of large appropriations.

The character of a State forester's work varies among the States. Where forestry is just beginning to receive attention, his first efforts must be largely of an educational and organizational nature. His chief task is to develop a forest policy for the State and to educate the people to protect and improve the handling of the forests within its borders. He must study the needs of the State and then go before the people and show them what must be done to put into effect the policy which he has formulated. He usually has to make a great many public addresses, issue bulletins, write articles for magazines and newspapers, and in every other possible way bring this message to the people. He must also obtain basic legislation and appropriations in addition to engaging in technical forestry work.

On the other hand, in those States where there is already a settled forestry policy the State forester's work is of a different character. His major activities are usually fire prevention and control, forest planting, educational work, and management of State-owned forests.

Scope of State Forestry Work

In the aggregate, some 27 million acres of land are in State forests. The type of administration given these State-owned lands varies. Many State forests are managed intensively, along lines similar to National-Forest management. Some State forests and parks are devoted primarily or entirely to public recreational use. In some States, substantial areas of State forest land—particularly scattered tracts which have come into State ownership through tax delinquency—has as yet received little attention.

State activity in protecting forests from fire, with the cooperation and financial aid of the Federal Government, has opened a field for the employment of many foresters. Trained men are also used in the propagation and distribution of planting stock. In those States where an active State forestry program has been developed, a number of trained foresters are employed. The State forester's staff may include technical assistants in immediate charge of the various lines of activity carried on by the State organization. District foresters or State forest rangers may be assigned

responsibility for the development and maintenance of the fire-control organization and other State forestry work in a designated part of the State. The work of the State district forester corresponds generally to that of a national district ranger except that usually he deals cooperatively with private forest landowners rather than supervising work on lands under his own direct charge. About 5 percent of the State and private forest land needing fire protection was still not covered by organized protection in 1962, and the protective work on some of the areas covered was inadequate to meet critical fire conditions. Extension and intensification of cooperative fire protection to a degree commensurate with the needs would call for employment of many additional trained men in State forestry work.

Extension Foresters

Forestry extension work is another field in which professional foresters find employment in the States in the capacity of extension foresters. These men are associated with the Federal-State cooperative extension program, which emphasizes the use of technical information and practices in the growing and management of timber as a crop on the farm. Every effort is made to build up the forestry knowledge of woodland owners so that they will have sufficient know-how for carrying on work in this field as they do with other crops. This is accomplished by providing owners with practical forestry information, and by conducting tours to forestry research units and successful operations of individual owners.

Service Foresters

At present 49 State forestry departments are working with the Forest Service in providing technical assistance to owners of private forests and to small sawmill operators and other processors of primary forest products. The Cooperative Forest Management Act of 1950, which replaced earlier legislation under which the work started, is the basis for this cooperative program. In 1962, technical assistance in woodland management was given to approximately 91,000 small owners, and 8,100 forest products operators were helped with plant and woods problems.

Both farm and nonfarm owners of small forests are now given help in making simple plans for the management of their woodlands; in marking the trees in need of cutting; in measuring these trees and estimating their volume; in determining the proper cutting and logging methods to use in the harvesting operation; and in marketing the harvested products. In addition, many owners are advised on planting, thinning, and pruning operations, as well as on the protection of their forests from fire, insects, and disease. The local forester who handles this cooperative forest-management project work is called the service forester. In some localities, however, he is referred to as the farm forester, county forester, or district forester.

Community Forests

A new field of employment for trained foresters is opening up through the development of community public forests by counties, municipalities, school districts, and other local government units or public institutions. Some of the town forests in New England were the earliest public forests in the

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An extension forester shows local farmers and their families how to build firelines in the forest. Firelines help to halt an onrushing fire.

United States and have yielded financial returns and other benefits to the communities for more than two centuries. In recent years the number of community forests has increased greatly.

The latest available reports have shown more than 3,600 community forests aggregating about 4½ million acres in 40 States. Of the total, 800,000 acres were maintained by municipalities, 3½ million acres by counties and townships, 160,000 acres by schools or school districts; and 40 thousand acres by other organizations.

In addition to parks for recreational purposes and purchases of forested watersheds for the protection of sources of domestic water supplies, many cities and counties are acquiring forest lands for investment and development purposes. Managed under multiple-use plans, similar on a smaller scale to those applied on the National Forests, such community forests can

supply numerous services to the public, including facilities for outdoor recreation, habitat for wildlife, watershed protection, a reservoir of work for local unemployed, and income to the community from forest products. Often the rehabilitation of a tract of cut-over or burned-over land can be undertaken as a community enterprise. Local public forests as living memorials to war dead have been proposed in some communities.

A number of schools maintain forests which not only serve as outdoor classrooms for the teaching of elementary forestry, conservation, and natural history, but provide an income to the schools from the growing and selling of forest products. The United States Forest Service is encouraging and cooperating in the establishment of community forests as part of a broad program of public forest development.

The proper management of community forest properties naturally requires the services of trained foresters. At present, most of the community forest enterprises that are being given technical forestry advice or direction obtain such service from State foresters or Federal forestry agencies. There is a growing tendency, however, toward the direct employment of trained foresters as community-forest managers.

Opportunities in Private Forestry

Though Federal and State agencies, educational institutions, and semipublic associations will doubtless continue to lead in research and extension, the largest field for professional foresters in the long run will be in private work. Three-fourths of all the commercial forest land in the 48 contiguous

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A logging-company forester, at left, discusses problems of handling logs with the two company owners, nearest the camera. A Forest Service officer, second from right, takes part in the discussion, since timber sold from a National Forest is being cut.

States, or 359 million acres, is in private ownership. This fact alone clearly indicates a large and fruitful field in private work for the trained forester.

Private owners may be classified in a general way as industrial, including lumber, pulp and paper manufacturing companies, and other large manufacturers of wood products; public-service corporations, such as railroads and water companies; recreation and hunting clubs; mining companies; owners of large private estates; and farmers and other small woodland owners.

Private owners provided some of the earliest examples of professional forest management in the United States, and some have handled their timberlands carefully for many years. In recent years, many more, especially among the larger industrial owners, have been adopting measures for continuous timber production. The Forest Service has set up as a permanent activity a project to work with the States, lumbermen's associations, and timberland owners to the end that improved woods practices may be extended. Lumbermen's and pulp and paper manufacturer's associations are also encouraging good forestry practice on industrial forest lands. In the past few years, several million acres of industrial holdings have been included in a "tree farm" program sponsored by industry associations. Recent State regulatory laws in several States look to increased attention to good forestry practice on private timberlands. All of these movements point to new opportunities for employment in private industrial forestry.

Forest Products Industries

Until recently, most of the industrial concerns employing graduates of forestry schools have used them mainly in logging engineering and allied work. Before World War II only about 1,000 foresters were employed by the forest products industries in forest-land management. Since forestry practice has expanded and intensified on industrial holdings, private industry now employs about 7,000 foresters.

The forester who enters the lumber, pulp and paper, or other forest products industries may be required to estimate standing timber, appraise stumpage, determine the best methods of cutting, estimate future growth, lay out logging roads or railroads, reduce waste, increase utilization, or participate in actual logging and milling operations. Experience for such work often must be gained by entering the business at the bottom and learning its practical and administrative details in a long and exacting apprenticeship. Many foresters find opportunities in this field, with possibilities of advancement to important managerial positions.

There is a growing field for specialization in industrial forestry. Some of the large operators conduct reforestation activities and other silvicultural work on their cutover lands. Many operators or associations maintain their own fire-control organizations. Industrial forest research is increasing, particularly in wood utilization. The growing use of wood in all sorts of products, as in the manufacture of plywoods, wallboards, plastics, and rayon, and the increasing use of such equipment as dry kilns and preserving plants to procure better utilization of lumber products, are creating opportunities for specialists in the industrial phases of wood use. Industry is also attempting to find new uses for little-used species and to create byproducts and new products which will broaden markets and utilize materials now wasted in the manufacture of primary products.

Though a knowledge of forestry is not essential to a retail or wholesale lumber dealer, a knowledge of woods and their properties gives the dealer an opportunity to speak with authority on the technical qualities of the woods and materials handled.

Other Private Forestry Work

There is a broad and as yet largely undeveloped field for forestry among public-service corporations owning timberlands. Many railroads own extensive tracts of this kind. Some of these corporations have already adopted a consistent and permanent policy of holding their timberlands and are introducing systematic forest protection and management. Some of the eastern railroads have considered the acquisition of forest lands and planting of trees, wherever necessary, for the production of ties and other wood supplies. Many have technical foresters in their industrial departments.

Many water companies hold extensive timber tracts on the drainage areas from which their water supplies are derived. These companies for the most part have adopted a definite policy of maintaining such land in forest growth. In many cases, they might find it advantageous to employ professional foresters to keep the forest cover in the best possible condition while at the same time yielding cash revenue.

Frequently mining companies own lands covered with tree growth. Many companies in the southern mountains, especially coal-mining companies, hold considerable areas for mineral development and also for the production of wood and timber for use in the mines. Some are already treating timbers with chemical preservatives and others have taken up the problem of conservative forest management on their hands. Some companies are attempting reforestation of areas ruined by mine dumps or open-pit operations.

Another class of private owners consists of clubs or individuals who have acquired forest property for hunting and other recreational purposes. Relatively few large tracts of land in private estates, however, are managed at present under forestry principles with a technical forester in charge. Usually work on the ground is supervised by a resident ranger or woods foreman. Where technical work is done, it is often directed by a consulting forester who visits the tract at intervals. Most of the forestry so far practiced on private estates has been, and, except for the largest owners, will probably continue to be of this character.

There are now more than 400 private firms and individuals who act as consulting foresters. This is a natural goal of some of the more mature and experienced men who have acquired a solid footing in the profession. Younger men are sometimes employed as assistants and as members of field parties. Some consulting or private practicing foresters conduct a very prosperous business, especially when they have an established reputation which brings a demand for their services in solving particularly important problems.

The operation of private holdings is likely to tend more and more toward conservation practices. This development will probably be accompanied by a growth in cooperative timber production and marketing associations among small landholders and farmers. Already, some mills are being supplied with needed timber through such organizations. A few cooperatives operate their own sawmills or wood-processing plants. Trained foresters

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A river birch only 27 months old has produced flower catkins, after receiving artificial 24-hour daylight for 18 months. A plant geneticist checks the results in this phase of tree improvement research.

are employed by the cooperatives in directing the operations of their members and in marketing the timber produced.

Compensation in private forestry depends largely upon the earning capacity of the individual. Ordinarily, foresters in private employ are paid at a somewhat higher rate than public forest officers in the same grade of work. Furthermore, where the forester works into a regular business, as, for example, in the lumber business, his remuneration will depend not only upon his technical attainments but his business capacity and value to the company.

Trade and Conservation Associations

Many of the national and regional trade associations of lumbermen, pulp and paper producers, and other forest-industry groups employ technical foresters as staff advisers or as directors of certain lines of promotional work. The top executive directors of several of these associations, in fact, are professional foresters whose experience and abilities led to their selection for these positions. The National Lumber Manufacturers Association, American Forest Products Industries, Inc., Western Pine Association, and American Paper and Pulp Association are some of the groups that employ technical foresters.

A number of foresters have found interesting opportunities with conservation organizations such as the American Forestry Association, and various State forest conservation associations. Men chosen for executive secretaryships of such associations usually have demonstrated ability in public relations. From time to time, some of these associations sponsor and finance special studies or surveys which call for the services of trained foresters. Men with experience in the particular line involved are selected to conduct such projects.

The professional organization of foresters in the United States is the Society of American Foresters, with headquarters in Washington, D. C., and regional sections in various parts of the country. The purpose of this organization is the maintenance of high standards in professional practice and promotion of the interests and welfare of the profession generally. Professional forestry training or practical experience substantially equivalent to that obtained in a school of forestry is the requisite for membership.

Teaching

Teaching offers opportunities to the technical forester. As noted earlier, 40-odd colleges and universities in the United States have schools or departments offering forestry courses. Advanced technical training plus teaching ability are requisites for appointments to a faculty position. Practical woods experience, in addition, often is an advantage.

Many foresters have gone into teaching after some years in forestry work with the Federal Government, States, or private industry. Occasionally, outstanding graduate students receive appointments as instructors, from which they can rise, if qualified, to assistant professorships and full professorships.

Compensation varies with the colleges. Top faculty positions in the leading universities pay salaries that compare favorably with those of principal Government forestry positions, but do not equal salaries in the higher brackets of private industry. The academic surroundings, privileges, and campus life, however, have a special appeal to some individuals. The teacher of forestry who is interested in research usually also has the advantage of being able to carry on original studies in connection with his regular schoolwork.

Conservation and elementary forestry are taught in some secondary and vocational schools, but the subject matter is seldom so technical as to call for advanced forestry training. Some foresters, however, have gone into high school teaching, and have found their forestry training useful.

LOOKING TO THE FUTURE

Forestry is one of our youngest professions. Fifty years ago there were practically no trained foresters in the United States. Starting from scratch, the forestry movement in just a few decades has made notable gains. Forest conservation as an ideal has won general approval. As yet, however, the practical methods and principles of forestry by which real conservation may be achieved are too little understood by the general public.

Forestry's greatest possibilities lie in the future. Forestry practice now is being applied only to a fraction of the Nation's forest area. National interest and security eventually will demand the institution of sound forest management on *all* of our forest land—one-third of the country's land area. The need for men with professional forestry training should increase. How rapidly this need will increase will depend ultimately upon public demand for the intensification of sound forest practice on the public lands and the progress made by private owners in placing more of their forest lands under adequate management.

FOREST SERVICE FILMS AVAILABLE

RAINBOW VALLEY. (Color; also b/w. 28 minutes.)

(The Story of a Forest Ranger.) Shows work and responsibilities of U.S. Forest Ranger in protecting and managing resources of National Forests. Also shows benefits of National Forests in form of timber, water, grass, wildlife, and recreation. TV.

A TREE IS BORN. (Color; also b/w. 29 minutes.)

The story of forest genetics. The same basic research procedures used in producing better agricultural plants and animals are being used to produce faster growing, healthier, better formed forest trees. Film shows some of these techniques. TV.

FOREST SERVICE ENGINEER. (Color; also b/w. 24 minutes.)

The story of the Forest Service engineers—men who share with forest rangers the responsibility of managing, protecting, and developing the resources of the National Forests. They design forest roads and trails, bridges, other types of facilities; supervise construction; survey and map forest areas. Film describes how two engineers feel about the challenges and opportunities of the job. TV.

WATERS OF COWEETA. (Color; also b/w. 20 minutes.)

Shows results of 20 years of research work at the hydrologic laboratory on Coweeta experimental forest in Nantahala Mountains of North Carolina; illustrates how management of forests affects the flow of water in streams. TV.

To find out about use of these films contact your land-grant college or local forester.

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